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11/21/02
Shellfish Survey
Charles Sayle III

On the 21st of November a random sampling of scallops of various age groups was taken from the dredge spoils of 1 tow from Charles Sayle III. Charles gave to the Marine Department for study a hand full of scallops from three boxes containing; dead shell, seed, and what he considered scallops that should be harvested. This sampling taken from 1 tow may be a good description of the level of effort required to harvest scallops, but it may not be the best representation of what lies on the bottom.

Third Bend Middle Ground

Harvestable Scallops	Seed	Shell
2 Adults, 17 Nubs	18 Seed	5 Adult Nub, 3 Seed, 8 Old Shell

The controversial Nub scallops were the focus of this survey, and were taken aside for closer examination. Eleven of the 17 were inspected solely for gonadal coloration, and then returned to the harbor with the rest of the scallops and shell. Six of the 17 were set aside for dissection, and a staining of a gonadal smear in order to do a sperm count. Though the coloration of the gonad and sperm counts at this time cannot be sole determining indicators as to whether or not a scallop has spawned, they are important factors to be referenced. Gonadal coloration is best observed prior to, and after a spawning episode brought on by temperature changes; such as in the late spring and late summer events. Also sperm counts this far beyond the spawning season need to be measured against white blood cell counts. White blood cells assist with phagocytosis during the readorption process, where sperm cells are recycled to conserve energy and maintain the health of the scallop through the winter. Also taken into consideration are morphological differences, such as shell size and height of the growth ring; as these characteristics can be used to estimate the age of the scallop. The higher the growth ring on the shell, the older the scallop, and the more likely it's ability to spawn.

Gonadal Coloration of 11 Scallops

Black Gonad (has not spawned)	Pale Gonad (spawned)
8 Nubs	3 Nubs

Results from Staining of 6 Scallops

Spawned	Shell Size	Ring Size	Sperm Count	Coloration	Description
#1 Y	7.1cm	10mm	0-2	Pale	No white blood cells
#2 N	7.2cm	Not Defined	0	Black	Large seed Not developed
#3 N	6.9cm	5mm	240	Pale/Black	White blood cells forming
#4 N	6.2cm	Not Defined	0	Black	Large seed Not developed
#5 N	7.1cm	7mm	180	Pale/Black	White blood cells present
#6 N	7.4cm	3mm	0-4	No Picture	Mostly white blood cells

Based on morphological differences and gonadal staining 76% of these Nubs did not spawn. By including the 2 classic adult scallops with the nubs to make up the total harvestable population there are still only 31.5% of these scallops being able to spawn before they are removed from the biomass. This means that if this is an accurate representation of what the fishermen want to take, they will be taking

roughly 68.5% of their catch of scallops out of the harbor before they have had a chance to reproduce. How is the scallop population expected to maintain its numbers with all other environmental stresses taken into consideration?

When removal of this large of a portion of the breeding stock occurs there is little likelihood that future yearly harvests will be able to be maintained. In fact annual harvests will most likely decline to the point where it is no longer profitable to go fishing. This will most likely result in a scallop population so low that it will take many years to rebound, and may even require a moratorium on fishing. The maximum sustainable yield that the fishery can handle is probably well below the 16,000 bushels that have been harvested annually for the last three years. This can be seen in the amount of effort that has increased yearly by fishermen in order to bring in their legal limits. The protection of the Nub scallop probably staved off an immediate collapse of the fishery by boosting the amount of reproduction occurring in the population. Protection of the Nubs also increased the age diversification in the population, which strengthened it as a whole by not relying on just one age group to reproduce for the following year. However with the recension of the mandatory 10mm growth line the diversity of the population will be reduced, and the stopgap to any year of bad recruitment will be removed. This short-lived species relies on its reproductive biomass entirely; the reduction of which will negatively affect future population numbers.